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10EE35

Third Semester B.E. Degree Examination, Dec.2014/Jan.2015

Electrical and Electronic Measurements and Instrumentation

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Obtain the dimensional equations for magnetic flux and magnetizing force in SI units.
(04 Marks)

   b. The expression for mean torque of electro dynamometer type wattmeter may be written as
      $$Td \propto M^a E^b Z^c$$
      where   M = mutual inductance between fixed and moving coils
              E = applied voltage
              Z = impedance of load circuit.
      Determine the values of a, b, and c after deriving the dimensions of Td, M, E and Z and
      write the equation for Td.   **(10 Marks)**

   c. Explain in brief fall of potential method for earth resistance measurement.   **(06 Marks)**

2   a. Write a note on types of sources and detectors used for a.c. bridges.   **(04 Marks)**

   b. With neat sketch, explain Kelvin double bridge. Obtain an expression for the balancing
      condition.   **(08 Marks)**

   c. An ac bridge circuit working at 1000 Hz. Arm ab is a 0.2 µF pure capacitance, arm bc is a
      500 Ω pure resistance, arm cd contains an unknown impedance, and arm da has a 300 Ω
      resistance in parallel with a 0.1 µF capacitor. Find the R & C or L constants of arm cd
      considering it as a series circuit.   **(08 Marks)**

3   a. Explain the advantages of instrument transformers.   **(06 Marks)**

   b. Write the differences between C.T. and P.T.   **(04 Marks)**

   c. A current transformer has a bar primary and 300 secondary turns. The secondary supplies a
      current of 5A to a non-inductive burden of 2Ω. The primary exciting ampere-turns are 100.
      The frequency of the supply is 50 Hz. The net cross sectional area of the core is 12 cm^2.
      Calculate the actual ratio and phase angle of the current transformer. Neglect the effects of
      leakage reactance, iron losses and copper losses.   **(10 Marks)**

4   a. With neat sketch, explain construction and working principle of dynamometer type
      wattmeter.   **(10 Marks)**

   b. With necessary figures, explain the calibration of single phase energy meter.   **(10 Marks)**

PART – B

5   a. With a neat sketch, explain the construction and working of Weston frequency meter.
(08 Marks)

   b. With a neat sketch explain the construction and working of electrodynamometer type single
      phase power factor meter.   **(08 Marks)**

   c. Write a short note on Q meter.   **(04 Marks)**

6 a. Explain with figure the front panel details of dual trace oscilloscope. (08 Marks)
   b. Explain the measurement of phase and frequency using lissajous patterns. (06 Marks)
   c. Explain the working of digital storage oscilloscope. (06 Marks)

7 a. Explain with a neat sketch, the construction and working of a Linear Variable Differential Transformer (LVDT). (08 Marks)
   b. Explain strain gauges in brief. (06 Marks)
   c. Explain photoconductive cells. (06 Marks)

8 a. Explain the digital data acquisition system. (08 Marks)
   b. With figure, explain the liquid crystal display. (08 Marks)
   c. Write in brief about signal generators. (04 Marks)

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